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BIOLOGICAL EVALUATION OF PITCH CANKER INCIDENCE IN SEED ORCHARDS IN LOUISIANA, MISSISSIPPI, TEXAS AND ALABAMA

by

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A one hundred percent survey of eleven seed orchards was conducted in early 1980 to determine the incidence of Pitch canker. Orchards of slash, loblolly, shortleaf and Virginia pine in Alabama, Louisiana, Mississippi, and Texas were examined. The disease was found in 5 of the 11 orchards; only 2 had an incidence of more than 10%.

INTRODUCTION

Hepting and Roth (1946) first found pitch canker disease on Virginia pine in North Carolina in 1945. Since that time, the disease, caused by Fusarium moniliforme var. subglutinans Wr. and Reink, has been reported by Phelps and Chellman (1976) to occur at varying levels of severity. It was not considered a serious problem until the late 60's when it was found on slash pine in Florida.

Susceptible species of pine include: Virginia (Pinus virginiana Mill.), slash (P. elliottii Engelm. var. elliottii and var. densa), longleaf (P. palustris Mill.), Scotch (P. sylvestris L.), tablemountain (P. pungens Lamb.), loblolly (P. taeda L.), shortleaf (P. echinata Mill.), and pitch (P. rigida Mill.). Of these, slash, loblolly, shortleaf, longleaf and Virginia pines are grown in commercial seed orchards in the Southeast. Pitch canker has been identified in seed orchards. Virginia pine and slash pine are reported to be the most seriously affected (Dwinell, 1976).

Damage caused by the fungus includes shoot (terminal or lateral) dieback, bole cankers (Dwinell and Phelps , 1977), and heavy pitch flow and pitch soaking of underlying wood (Berry and Hepting, 1969). Cankers are usually sunken and retain the overlying bark (Berry and Hepting, 1969). Shoot mortality is usually confined to the current growth and results in several laterals competing for dominance after the terminal is killed (Bethune and Hepting, 1963). The fungus has also been isolated from female strobili, aborted conelets, and aborted cones on slash pine (Miller, 1978). In most cases trees not killed outright will survive and recover from the disease.

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METHODS

Eleven seed orchards located in Alabama, Louisiana, Mississippi, and Texas were selected for examination. Orchards selected were at least 4 but not more than 20 acres in size and at least 5 but not more than 25 years old. Due to the lack of an adequate number of slash pine orchards fitting these criteria, orchards of loblolly, shortleaf, and Virginia pine were also used; especially those that had previous reports of top or tip dieback of undetermined cause.

All trees in each orchard were examined for top/or tip dieback from the ground. Trees that showed either type of damage were sampled to determine the causal agent. Samples were kept chilled and returned to Pineville for culturing and isolation. The standard Fusarium isolation technique (as described by Nelson (1976) was used and cultures were confirmed by Dr. William Pawuk, SFES, and Dr. Paul Nelson, Pennsylvania State University.

RESULTS

The results of the evaluation are presented in Table 1.

Orchard	Location	Species	% trees w/PC
Masonite	Laurel, MS	Slash	0
Boise Southern	DeRidder, LA	Slash	0
Kurtz	State Line, MS	Slash	0
Geneva	Opp, AL	Slash	0
Crown Zellerbach	Bogalusa, LA	Loblolly	0
Erambert *	Brooklyn, MS	Slash	30%
Owen-Illionois	Jasper, TX	Slash	0
International Paper Co.	Atmore, AL	Slash	7%
Coosa Pines (Kimberly Clark)	Childersburg, AL	Virginia	37%
Container Corp. of America	Brewton, AL	Slash	2%
Stuart Project	Pollock, LA	Shortleaf	.6%

Table 1: Comfirmed incidence of pitch canker (PC) in several southern seed orchards.

* One block of Florida slash pine

DISCUSSION

The highest incidence of pitch canker was found in a Virginia pine seed orchard in central Alabama, with the next highest being a slash pine orchard in central Mississippi. Other than these two orchards, an extremely low incidence of pitch canker was found in those orchards surveyed.

Of the orchards surveyed only two, the Erambert and the Kimberly Clark Orchard showed serious damage from pitch canker. Both orchards have experienced an increase in the incidence and severity of the disease following severe storms (eg. hurricane and tornado). It appears that with these two exceptions pitch canker losses in seed orchards are insignificant at the present.

In addition to the flagging caused by pitch canker some insect damage was noted in various orchards; needle browning on terminals (needle midge= Contarinia spp) terminal mortality (tip moths = Rhyacionia spp.), and top mortality (coneworm larvae = Dioryctria spp.). Damage from these insects could be confused with pitch canker in a ground survey unless adequate sample collecting of the affected terminals is done.

MANAGEMENT RECOMMENDATIONS

Currently there are no therapeutic measures available for pitch canker. Control is accomplished by whole tree removal.

Preventative measures which aid in reducing infection in seed orchards include:

1) Avoid mechanically wounding trees between July and November.

2) Properly adjust pads on tree shakers; too tight causes bark breakage on bole while too loose results in unnecessary top movement which in turn normally causes limb breakage.

3) Clip cones rather than twisting them off by hand; wounds resulting from clipping are generally smaller and overall is less damaging.

4) While roguing diseased trees has only minimal influence on disease incidence (Bethune and Hepting, 1963), when selecting trees to be rogued during normal silvicultural operations, those trees with stem cankers should be considered for removal; pitch canker shows a clonal suscept pattern, elimination of susceptable seed source should yield long term benefits.

5) Wilkinson et al. (1977) suggest that ammonium nitrate fertilization is a pre-conditioning factor leading to high pitch canker incidence; consider lower levels or elimination of this fertilizer.

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